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ABSTRACT

Effective technology empowers learners and helps them assume responsibility for their own learning. Characteristics of effective instructional technology should guide the development of computer software and other types of technology. Software should provide for interaction since adults learn through active engagement. Feedback should be non-judgmental and private. Learner-controlled instructional programs allow users to stop at any time and to reenter where they stopped. Learner-controlled accessories are empowering to adults. Directions should be always visible or easily accessible. Placement of directions and graphics on the screen should be consistent. Title screens should notify learners when they begin a new section; summary screens should inform them when they complete a section; the screens should organize and provide a synopsis of the material presented. Instructional sections should be short to accommodate short attention spans. Both learners and instructors should be able to view the finished sections in the record-keeping system. Simple but appealing graphics assist in learning and keep the learners' attention focused. In computer-assisted instruction, screens should be sparse wherever possible. Built-in diagnostic and mastery tests are useful when learners move from one class to another. If possible, technology should be open-ended to allow instructors to enter their own materials. A detailed, graphically oriented instructor's manual written in non-technical language is essential. (YLB)

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Characteristics of Effective Instructional Technology

Brett Bixler & Eunice N. Askov, Institute for the Study of Adult Literacy

Effective technology will empower learners and help them assume responsibility for their own learning. While this discussion primarily pertains to computer-assisted instruction (CAI), most of the characteristics are also applicable to other types of technology (Baker & Bixler, 1990; Bixler & Spotts, 1992). These are the characteristics that guide the software developed at the Institute for the Study of Adult Literacy. [For more information on this software, see page 7.]

Interaction. Adults learn through active engagement. For example, if trainers use passive media such as video, they should accompany it with discussion and practice activities. An advantage of video is that a trainer may stop it at any point to increase interaction.

Feedback. Learners need to know if their responses are correct. Feedback should be non-judgmental and private. For example, software that produces a squeak or a buzz when a user selects the wrong answer is not advisable. A good program will explain why an answer is correct, even if users answered correctly, because they may have guessed.

Learner control. Learner-controlled and individualized instructional programs allow users to stop at any time and to re-enter where they stopped. Some software, for example, that is designed for young children, yet used with beginning adult readers, does not permit the user to exit the program until it is completed. This feature could erode a learner's self-concept by letting the technology, rather than the learner, control the pace and delivery of instruction.

Learner-controlled accessories. Navigational tools, such as arrows that return learners to the previous screen or back to the menu, are empowering to adults. A built-in dictionary that learners can access at any time presents a word, provides the definition of the word, and uses the word contextually in a sentence. A word processor that learners can access at any point during a lesson enables them to record notes about and reactions to the lesson, enhancing metacognitive (learning how to learn) abilities. A good program will ask learners to comment on any difficulties they experienced, aspects of the lesson that they enjoyed, and so forth.

Directions and help. Directions should be always visible or easily accessible. They should prompt learners step-by-step through difficult exercises. An on-line "help" button should always be available to learners who are confused or forget directions. Speech (synthesized and digitized) can direct and reinforce

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learning for beginning readers. If speech isn't possible, teachers or tutors should use the computer as a tool for beginning adult readers or non-native speakers.

Consistency. Placement of directions and graphics on the screen should be consistent wherever possible. Common and consistent phrases for all directions should be used. Graphics should appear in the same general area on the screen in sequential exercises where new graphics may replace previous graphics. Explicit organization increases memorability of new material (Bower, 1970).

Organization. Title screens should notify learners when they begin a new section (Murray, 1989). Summary screens inform learners when they complete a section, and the screens should organize and provide a synopsis of the material presented. Instructional segments should be short to accommodate short attention spans. Adults have a sense of accomplishment when instruction is divided into modules, units, and sub-units. Both learners and instructors should be able to view the finished sections in the record-keeping system.

Graphics. Simple but appealing graphics assist in learning (Bean, Singer, Sorter, & Frazee, 1986). Furthermore, attractive graphics keep the learners' attention focused on the task (Hannafin & Peck, 1988). In CAI, screens should be "sparse" (with verbal and content density) wherever possible. Clutter-free screens allow users to concentrate on the intended concept. Simple line drawings without any extra detail, shading, or fill patterns enhance a concept. Large print fonts also limit the amount of information placed on one screen, and older adults may find them easier to read.

Assessment and record-keeping. Built-in diagnostic and mastery tests are extremely useful when learners move from one class to another. The tracking system should inform learners of the materials and activities they need to review before proceeding or if they should seek outside assistance.

Customization. If possible, technology should be open-ended to allow instructors to enter their own materials, such as words, definitions, and sentences. Some commercial CAI programs offer the customization feature not only for instruction but also for assessment.

Instructor's Manual. A detailed, graphically oriented manual is essential, preferably one that displays what the learners are seeing on-screen. Since inadequate staff training is often a problem, a well-written manual in non-technical language is essential.❧

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